Evaluation of Position Description

Labor Category/FLSA: Exempt

_____**Current Position Description**
__X__**Proposed Position Description**

Date Prepared: 07/08/03

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Title: HR Specialist

Position Title/Series/Grade: Electrical Engineer, GS-850-12

ORGANIZATION: Division of Property Management

References: Electrical Engineering Series, GS-850

Introduction: This position provides electrical engineering analysis of systems and advises on long range planning related to electrical generation and distribution systems; provides consultation to other Branches, Sections, and Units; and resolves electrical engineering tasks associated with these services and programs. The engineer must be concerned with a variety of conventional electrical equipment, apparatus and systems. As a technical professional in utility system design, construction, and operation and maintenance, incumbent review drawings and make field visits to resolve problems.

Series and Title Determination: The employee serves as an electrical engineer and technical expert responsible for the coordination of multiple efforts to carry out the electrical engineering program activities of the Division. The work requires knowledge of the principles of engineering and extensive experience to coordinate complex program projects. The position meets the criteria of the Electrical Engineering Series, GS-850 series that includes professional engineering positions which require primarily application of knowledge of the physical and engineering sciences and mathematics, electrical phenomena, and the principles, techniques, and practices of electrical engineering. The work pertains primarily to electrical circuits, circuit elements, equipment, systems, and associated phenomena concerned with electrical energy for purposes such as motive power, heating, illumination, chemical processes, or the production of localized electric or magnetic fields. **Electrical Engineer** is the authorized title for non-supervisory positions classified in this series.

Grade Determination: The Electrical Engineering Series, GS-850 provides grade-level criteria in terms of two factors: **Nature of Assignment** -- deals with nature, variety, and purpose of duties performed; scope and difficulty of the assignments; knowledge required and the degree to which experienced judgment is required in evaluating alternative courses of action or diagnosing problems or failures; extent to which the engineer must define the problem; originality required and **Level of Responsibility** -- deals with extent and depth of review given to completed work and guidance

received while the work is in progress; nature and purpose of personal contacts; impact of findings, recommendations and advice; authority to commit the activity or agency to a course of action; and availability of guidelines and precedents.

Nature of Assignment:
The incumbent is responsible for engineering problems associated with complex electrical substations and distribution systems and technical and management support to the High Voltage Group. The incumbent is concerned with a variety of conventional electrical equipment, apparatus and systems. The employee visits construction projects to observe and report on the technical features of construction operations pertaining to specialization with the electrical engineering field and examines preliminary and final design features of electrical systems and configurations prepared by NIH engineers to determine that they will produce a satisfactory end product. Based upon field evaluations and studies, the incumbent develops and recommends changes to plans and specifications and technical manuals. As a senior level technical expert in utility system design, construction, operation, and maintenance the incumbent acts as a troubleshooter by reviewing drawings and making field visits to resolve complex and unusual problems. This matches the grade 12 level described in the standard.

According to the standard GS-12 engineers apply deep and diversified knowledge to atypical or highly difficult assignments in a subject-matter area or functional area. Precedents for their assignments are sometimes absent, but more commonly their relationship to the particular assignment is obscure. Conflicting issues often characterize GS-12 assignments. They must comprehend fully the relationship between their assigned and related areas and branches of engineering. They usually perform analysis of complicated projects and the approaches and procedures they adapt or develop are followed by less experienced engineers on subsequent assignments. Their assignments are further complicated by the many operations which the equipment or systems must perform and the many variables which the engineer must consider.

The work is analogous to the following illustration in the standard:
Develop specifications for repair, modification, maintenance, and testing of new types of systems with many component pieces of equipment. Assignments require knowledge of the current state of technology in the power field as well as the functioning of the existing system. The objectives of the study are to determine means to increase efficiency of operation and improve network reliability.

Level of Responsibility: The incumbent works under the direction of the supervisor and independently plans and carries out assignments. The incumbent is responsible for taking independent actions and making decisions to solve technical problems, and for dealing with sensitive issues involving other agencies and the industrial community. The decisions, recommendations, and findings made by the employee are considered technically authoritative and are accepted without significant change. Completed work is generally reviewed only for adherence to policy and for assurance that broad technical objectives are fulfilled. This meets the level of responsibility described at the grade GS-12 in the standard.

According to the standard supervisors inform grade GS-12 engineers of the objectives or operational requirements that the equipment or systems must meet and relative priority of their assignments, but the engineer is free to analyze problems and develop approaches and work plans. They receive little technical guidance. The decisions they make are usually accepted by higher authority as a basis for action except when policy, program, or budgetary considerations are overriding. In their assigned functional area they act as spokesman for their activities.

On both the **Nature of Assignment** and **Level of Responsibility** this position meets the grade GS-12.

Classification Determination: Electrical Engineer, GS-850-12.

POSITION DESCRIPTION

Electrical Engineer, GS-850-12
Division of Property Management

Introduction

The Division of Property Management (DPM) serves all of the NIH Community by providing support for renovations, new construction and maintenance of existing facilities, utilities and grounds. The Division provides professional leadership for the engineering programs of the Department of Health and Human Services, National Institutes of Health (NIH). The scope of DPM operations is such that the effectiveness with which they are carried out has a major and direct effect on the worldwide biomedical research programs of the NIH. In addition to the main facilities at the Bethesda Campus and in Poolesville, MD, NIH has facilities at Research Triangle Park, North Carolina, Rocky Mountain Laboratory in Montana and the Gerontology Research Center in Baltimore, MD.

This position is organizationally located within the DPM in one or more of the subordinate organizational components responsible for the provision of operations and maintenance of NIH facilities. The position requires the incumbent to be flexible in the types and complexity of work performed. The Central Utilities is responsible for management of the utility services program at NIH. This includes the operation and maintenance of the central boiler plant, central air conditioning plant, and all underground utility distribution and collection systems. Other related functions include environmental compliance, energy and water management, utility budgeting, metering of utility consumption, planning for utility system expansion, and permitting of new connections and alterations to the utility systems. The facility and utility operations and maintenance program is complicated, and critical elements are intensified by aging equipment and buildings, rapidly expanding and changing utility requirements, aging support infrastructure, unpredictable purchased utility prices, rapidly changing legislation and federally mandated programs and to a large extent by the complexity of the various missions being supported.

The duties of this position are to provide electrical engineering analysis of systems and to advise on long range planning relating to electrical generation and distribution systems. Also, provide consultation to other Branches, Sections, and Units, and perform the electrical engineering tasks associated with these services and programs. These tasks require professional competence and experience and a minimum of routine supporting tasks. The position is primarily concerned with engineering problems associated with electrical substations and distribution systems and technical and management support to the High Voltage electricians. The engineer must be concerned with a variety of conventional electrical equipment, apparatus and systems. Visit construction projects to observe and report on the technical features of construction operations pertaining to specialization with the electrical engineering field. Examines preliminary and final design features of electrical systems and configurations prepared by architect-engineers and NIH engineers to determine that they will produce a satisfactory end product. Based upon field evaluations and studies, recommend changes to guide specifications, plans and specifications, technical manuals, policy, etc. As a technical professional in utility system design, construction, and operation and maintenance, incumbent review drawings and make field visits to resolve problems.

Major Duties and Responsibilities

The major duties and responsibilities are:

A: Engineering Consultation and problem Resolution (20%)

Providing professional electrical engineering consultation and analysis to the organization. This requires the application of knowledge and experience in the solution of electrical engineering problems. Also, responds to requests relative to specific and immediate electrical distribution systems problems relating to a distribution system and/or component failure. The incumbent assures that the latest state-of-the-art applications are applied to avoid future operational problems and resolves technical disputes and problems with public utility companies in regard to facilities interconnecting NIH systems and utility company systems.

B: Long Range Utility Planning (20%)

Formulates long-range plans for the development and operation of electrical distribution systems (Master Utility Plan), to assure that the overall development of the various distribution systems will meet the long range mission requirements of NIH, as defined by the Master Facility Plan. Such electrical master utility plans will be based on analyses of existing electrical distribution system loads, project loading growth, existing system configuration, required reliability and state-of-the-art equipment, technology, operation and management to assure the most efficient systems for given reliability requirements. Also, to ensure knowledge is properly documented, electrical utility drawings and databases will be developed and maintained.

C: System Analyses and Technical Adequacy (20%)

Performs field studies and engineering analyses on high, medium, and low voltage electrical distribution systems and components to assure they continue to meet the minimum requirements to assure system integrity. Conduct computer modeling and simulations to analyze the short circuit and load flow conditions of the electrical distribution systems, and to assure that the system and components are operating within their designed constraints and the proper coordination among the protective devices. Perform analyses on the electrical distribution systems to ensure the systems and components operate at the most efficient and reliable production levels. Perform engineering analyses to assure the most efficient and economical utility delivery (component & systems). Also, writes correspondence and contract documentation to explain, provide directions, and to procure and resolve equipment and system problems. Also, assists in the technical development and implementation of a utility metering program with emphasis on electricity.

D. Develop and maintain Preventive Maintenance and Repair and Improvement (R & I) Programs (10%)

Analyze electrical distribution systems, reviewing all the related literature and documentation, and develop and update comprehensive preventative maintenance programs covering all pertinent electrical distribution system components. Perform periodic analyses, inspections, and reviews of electrical distribution systems to identify system deficiencies relative to capacity, flexibility, component condition, reliability, efficiency, operation, maintenance and safety. Evaluate deficiencies, develop alternative solutions to correct deficiencies, compare alternative solutions on a technical and economic basis, and develop comprehensive R&I Program

requirements to correct deficiencies. Such corrections should be established in coordination with other organizational components to maximize system reliability while minimizing utility rates.

E: Project Plans and Specification Review and Coordination (10%)
Review Building and Facility (B&F) Projects for impact upon the adequacy of electrical distribution systems, adequacy of planning of interface with distribution systems and adequacy of energy conservation considerations.
Assure the adequacy of electrical utility system planning to accommodate the electrical loading increase associated with the planned projects.

Provide guidance, data and information on a continuing basis to the designers for use in designs and specifications that interface with electrical distribution systems. Review plans and specifications, which impact electrical distribution systems to assure compliance with the required electrical system development and operation. Provide specific and detailed requirements (characteristics, capacity, rating, protective equipment, protection scheme, etc.) for interconnections between NIH electrical utility systems and the systems of utility suppliers. Provide construction support and technical assistance on electrical utility projects.

F: Procure Utility Service Analysis and Support (5%)
Provide the required technical support to the Central Utilities as follows:

Determine and verify the specific technical parameters required for each electrical service procurement action.

Analyze the ability of the utility supplier to provide the present and future electrical service requirements and the inherent reliability of the utility supplier's plants, transmission, and distribution system.

Perform cost and benefit analyses relative to economic and technical parameters of the different means by which the utility supplier could provide the electrical service.

Analyze the interface requirements for electrical service from the utility supplier to assure compatibility with the NIH facilities.

G: Energy Conservation Customer Support (5%)
Assist in conducting surveys and minor studies of the electrical distribution and utilization systems for the sole objective of conserving energy, or as part of a larger study and analysis of the overall efficiency of electrical distribution systems and components. Evaluate inefficiencies, develop electrical operating and management procedures for the more effective utilization of energy, and develop projects to modify electrical distribution systems and utilization systems in order to increase the efficiency of these systems.

H: Perform Utility System Testing and Field Investigation (10%)
Develop, establish and execute specific programs of testing of electrical distribution and utilization system components in order to ascertain their electrical integrity. Analyze and evaluate the results of such a testing program and recommend specific actions based on test

analyses. Perform field investigations, including testing, to determine causes of load, voltage or frequency fluctuations, or to determine the cause of the failure of an electrical component. Analyzes deficiencies and develops optimum solutions to correct the deficiencies. Develop (in coordination with the High Voltage Group) and use state-of-the-art Supervisory Control and Data Acquisition (SCADA) technology to monitoring and control electrical distribution systems.

Factor 1, Knowledge Required By The Position

Knowledge of electrical engineering principles and theory of the type, scope and thoroughness ordinarily acquired through completion of a four-year engineering curriculum in an accredited university leading to a bachelor degree in electrical engineering, and a minimum of four (4) years of professional experience in the discipline.

Knowledge of, and experience in, the generation (emergency power & cogeneration), transmission, distribution and utilization of electricity. Incumbent must have a strong knowledge of the design, operations and maintenance, inspection and testing, and analysis of electrical distribution systems.

Knowledge and ability to perform short circuit analyses, load flow analyses, system impedance analyses, and relay coordination studies using state-of-the-art computer modeling and simulations software, e.g., Computer Aided Plotting for Time Overcurrent Reporting (CAPTOR), Distribution Analysis for Power Planning Evaluation and Reporting (DAPPER), ANSI Fault Analysis (A_ FAULT).

Knowledge and ability to perform field investigations to resolve system and component problems. Must also have the knowledge and ability to specify testing requirements to ascertain system and component integrity and interpret the results of such tests.

Knowledge of the NIH's planning process in order to be effective in preparing electrical master utility plans.

Knowledge of the Federal and/or NIH policies, instructions and regulations applicable to the operation and maintenance of electrical distribution systems. Incumbent shall also have a working knowledge of the National Codes applicable to the design, construction, operation, maintenance, inspection, and testing of electrical distribution systems and components.

Knowledge of utilities systems operations, particularly Public Works utility systems. Must have knowledge of the commercial utility operations and the regulatory environment that they must operate.

Knowledge and ability to employ tact and persuasiveness in dealing directly with all levels of professional and nonprofessional personnel within the DES, from blue collar workers to the Senior Executives, as well as technical and management personnel in engineering, ORS, the Institute Centers (ICs), commercial utility companies, and other private industries.

Ability to interpret Federal, ORS, and higher level NIH policies and regulations, to evaluate the impact they have on activities supported, and to provide appropriate program guidance and assistance.

Ability to incorporate state-of-the-art engineering and scientific concepts into assigned program policies and procedures.

Factor 2, Supervisory Controls

The position is under the general-supervision of the GS-801-13, Supervisory General Engineer. The supervisor sets overall objectives and allocates resources for work assignments. The incumbent develops the schedules and methodologies under which the work will be accomplished, for review and acceptance by the supervisor. The incumbent has independent responsibility for planning and carrying out evaluations and rendering advice to electricians, other engineers, and management. Uses experience and knowledge to resolve issues and interprets policies and regulations to accomplish the assigned tasks. The results of the work assignments are considered as technically accurate and reviewed with respect to their effect on the overall electrical utility program. Reviews concentrate on fulfillment of program objectives, adherence to administrative policy, and assurance that technical objectives have been met. Whenever necessary, the incumbent coordinates assignments with other organizations to assure policy is maintained.

Factor 3, Guidelines

Guidelines include a national and local codes and standard professional material, federal and state laws and regulations, HHS, NIH directives, local instructions, budget guidance, standard business references, economic indices and labor rates, federal and commercial catalogues. Due to the requirements, guidelines may not apply directly and require a degree of interpretation to determine the extent of relevance to each type of problem encountered. The incumbent is to use resourcefulness, judgment, and experience to identify methodologies for solving problems which may be outside traditional engineering standards or practices. The incumbent is to prepare guidelines and methodologies to effectively execute the various assigned utility engineering programs. The incumbent researches and utilizes practices and policies, engineering design manuals, guidelines, polices and practices of other Federal agencies, engineering textbooks, and pertinent professional organizations and industry standards.

Factor 4, Complexity

The work involves long range planning relative to the forecasting of electrical utility demand and energy production requirements, analyzing and programming for electrical distribution system configurations to meet reliability requirements, analyzing and programming for system efficiency, etc.

The work involves high and medium voltage electrical distribution systems, which have evolved over extended periods. There is a need to resolve equipment and systems problems associated with different types and makes of equipment and with obsolete and state-of-the-art technology.

The incumbent must be able to extend methods to solve construction, operation and maintenance problems.

The work also requires the use of state-of-the-art computer modeling and simulation software and hardware to effectively analyze utility systems and components capabilities, their reactions under adverse conditions or planned changes, and determine the proper operational constraints, parameters, and settings. The decisions at all phases require the follows: analysis of alternatives, consideration of technical advances, evaluation of technical and program needs and time constraints, determination and analysis of cost, impact upon other budget and planning actions, and long range impact upon resource managers and customers.

Factor 5, Scope and Effect

The purpose of the work is to provide electrical engineering support to the operational personnel in order to maximize the efficiency and effectiveness of the utility plants and distribution systems, while minimizing the electricity costs. A wide variety of engineering consultation, inspection, analysis, testing, review and monitoring programs will be implemented to meet these objectives. Incumbent will be the point of contact for electrical engineering information, actions, and policy.

Factor 6, Personal Contacts

In the execution of the incumbent's programs and assignments, incumbent must communicate with other management organizations. Such communications includes engineering, operational and maintenance, and management personnel. Also, communicate with the technical personnel within utility companies and municipalities, technical professional organizations, pertinent levels and parallel organizations within other federal agencies. These contacts are made through personal visits, briefings, meetings, conferences, telephone conversations, and written correspondence.

Factor 7, Purpose of Contacts

Contacts are to determine problem areas and resolution of problems; provide effective customer liaison; maintain customer satisfaction; gather data during technical, operational studies, analyses, inspections, assessments, monitoring processes, and in response to specific problems or future planning; coordinate and negotiate commercial utility service and define service limitations and opportunities, with commercial suppliers and other Federal agencies; coordinate with management and employees in the acceptance of new methods, work procedures, to implement changes in established operational and business procedures, etc; consult with technical, engineering, operations, management personnel to exchange information associated with common engineering, operations, and management programs (existing or potential problems, opportunities, etc.); and obtain information from commercial companies or vendors regarding methodologies, skills, equipment, automated systems, training, or resource assistance.

Factor 8, Physical Demands

The work is primarily sedentary; however, there may be some climbing, walking, bending, etc. involved in inspecting, evaluating, and assessing utility facilities during pre-construction, construction, and post construction activities

Factor 9, Work Environment

The work is normally performed in an office setting where there is adequate heating, lighting and ventilation. However during field visits, the incumbent is exposed to electrical distribution systems and structures that involve moderate risk (especially facilities that house medium voltage electrical distribution equipment). He or she is also sometimes exposed to adverse weather conditions during such field visits.